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EFFECTS OF PAIRING AND QUADRUPOLE FORCES ON THE BRANCHING RATIOS FROM THE HIGHER EXCITED STATES IN SPHERICAL EVEN - EVEN NUCLEI

by

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R.A. RICCI (Istituto di Fisica Superiore dell'Università — Napoli)

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LETTERE ALLA REDAZIONE

(La responsabilità scientifica degli scritti inseriti in questa rubrica è completamente lasciata dalla Direzione del periodico ai singoli autori)

Effects of Pairing and Quadrupole Forces on the Branching Ratios from the Higher Excited States in Spherical Even-Even Nuclei (*).

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(ricevuto il 21 Maggio 1962)

The vibrational structure of a large class of spherical even-even nuclei has been demonstrated, in the last years, by spacing, spin and branching ratio of the two lower 2+ levels, following the basic analysis of SCHARFF-GOLDHABER and WENESER (1).

A more complete description of the excited states of such nuclei is quite difficult due to the complexity of the spectrum.

One can, however, try to put in evidence further general properties interesting a larger part of the excitation spectrum and look for a more general interpretation. This has been done recently for the deexcitation properties of higher excited states with respect to the 2+ lover vibrational members (2).

Some regularities in branching ratios were established, from which two quite general features can be extracted:

1) the E2 transition probabilities to the upper 2+ member are strongly enhanced against the corresponding ones to the lowest 2+ level;

2) the presence of more than one 4+ level (or with spin different from 4) with the above property in some cases cf. ^{104}Pd, (^{106}Pd (3) ^{192}Pt.

(*) This work has been partially done as part of the program of the Nuclear Spectroscopy Group of Naples, working under a Contract between EURATOM and C.N.E.N.

(1) G. SCHARFF-GOLDHABER and J. WENESER: *Phys. Rev.*, **98**, 212 (1955).

(2) R. VAN LIESHOUT, R. A. RICCI and R. K. GIRGIS: *Nuovo Cimento*, **21**, 379 (1961).

(3) W. G. SMITH: *Phys. Rev.*, **122**, 1600 (1961).

used in this Note it seems interesting that it can produce, besides the three phonon state $[2]^3_4$ another $4+$ level (namely the $\{(4)\,(2)\}_4$. state) which shows up the behaviour described above in (1) and (2). We would like, therefore, to suggest that the « pairing » plus long range forces coupling scheme could be the basis of a more general interpretation of the electromagnetic properties of even-even spherical nuclei. A more realistic and detailed theoretical investigation of the consequences of the above coupling scheme has been undertaken and will be compared to a more extensive systematics of empirical data.

* * *

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